

WHAT IS CLAIMED IS:

5 SUB A' 1. A communications system providing a seamless switch from initially receiving data over a unicast session to receiving said data over a plurality of synchronized multicast sessions, said communications system comprising:

a server transmitting said data over said unicast session wherein said unicast session transmits multicast sequencing data, said server responsive to a request to stop transmitting said data over said unicast session at a next multicast synchronize point; and

10 said server transmitting said data over said plurality of synchronized multicast sessions, said server sequencing the transmission of said data in accordance with said multicast sequencing data between said plurality of multicast sessions wherein said server uses one of said plurality of multicast sessions to transmit said data for a predetermined period of time at any point in time.

15 2. The communications system of Claim 1, wherein said server transmits a second multicast sequencing point plurality of multicast sessions includes a first multicast session and a second multicast session.

3. The communications system of Claim 1, wherein said data comprises a multimedia stream.

20 4. The communications system of Claim 1, wherein said multicast sequencing data is transmitted before said data.

5. The communications system of Claim 1, wherein said multicast sequencing data is transmitted over a unicast control channel.

25 6. The communications system of Claim 1, wherein said multicast sequencing data is transmitted at periodic intervals.

7. The communications system of Claim 1, wherein said predetermined period of time is substantially the same for said plurality of multicast sessions.

8. The communications system of Claim 1, wherein said predetermined period of time is different for said plurality of multicast sessions.

30 9. The communications system of Claim 1, wherein said predetermined period of time corresponds to the transmission of a number of packets.

10. The communications system of Claim 1, wherein said predetermined period of time is based on time units.

11. The communications system of Claim 1, wherein at any point in time prior to said request to stop, said unicast session and said one of said plurality of multicast sessions transmitting are transmitting substantially the same data.

12. The communications system of Claim 1, wherein said predetermined period of time is longer than the sum of the time required for said client to join one of said plurality of multicast sessions and the time required for said client to request termination of said data transmission over said unicast session at the next multicast synchronize point.

13. The communications system of Claim 1, wherein said multicast synchronize point is substantially at the end of said predetermined period of time.

14. The communications system of Claim 1, wherein said request to stop transmitting said data over said unicast session is received over a unicast control channel.

15. The communications system of Claim 1, wherein said request to stop transmitting said data over said unicast session is received over said unicast session.

16. The communications system of Claim 1, wherein said multicast sequencing data includes an ordering of said multicast sessions and said predetermined period of time.

17. The communications system of Claim 1, further comprising:  
a client configured to receive said data over said unicast session, said client responsive to a signal

to join said plurality of multicast sessions, said client identifying as a joinable multicast session one of said plurality of multicast sessions currently not transmitting said data and which will not be transmitting for at least a sufficiently long time, said client joining said joinable multicast session, said client joining the remaining of said plurality of multicast sessions when said client starts receiving said data over said joinable multicast session; and

to transmit to said server said request to stop transmitting said data over said unicast session at the next multicast synchronize point.

18. The communications system of Claim 17, wherein said predetermined period of time is longer than said sufficiently long time.

19. The communications system of Claim 17, wherein said sufficiently long time is longer than the sum of the time required for said client to join said joinable multicast session and the time required for said client to request said server to stop transmitting said data over said unicast session at the next multicast synchronize point.

5 20. The communications system of Claim 17, wherein said signal to join is a user request.

21. The communications system of Claim 17, wherein said signal to join is automatically issued by said client.

10 22. The communications system of Claim 17, wherein said client is further responsive to a signal to unsubscribe from said unicast session once said client starts receiving said data over said joinable multicast session.

23. A communications system providing a seamless switch from initially receiving data over a unicast session to receiving said data over a plurality of synchronized multicast sessions, said communications system comprising:

15 a client configured to receive said data over said unicast session, said client responsive to a signal

to join said plurality of multicast sessions, said client identifying as a joinable multicast session one of said plurality of multicast sessions currently not transmitting said data and which will not be transmitting for at least a sufficiently long time, said client joining said joinable multicast session, said client joining the remaining of said plurality of multicast sessions when said client starts receiving said data over said joinable multicast session; and

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to transmit a request to stop transmitting said data over said unicast session at a next multicast synchronize point.

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24. The communications system of Claim 23, wherein said sufficiently long time is longer than the sum of the time required for said client to join said joinable multicast session and the time required for said client to request said server to stop transmitting said data over said unicast session at the next multicast synchronize point.

30 25. The communications system of Claim 23, wherein said signal to join is a user request.

26. The communications system of Claim 23, wherein said signal to join is automatically issued by said client.

27. The communications system of Claim 23, wherein said client is further responsive to a signal to unsubscribe from said unicast session once said client starts receiving said data over said joinable multicast session.

28. A method of switching from a first session to a plurality of multicast sessions, said method comprising the acts of:

transmitting first data over said first session;

transmitting second data over said plurality of multicast sessions, wherein a first of said plurality of multicast sessions transmits a portion of said second data for a period of time during which a second of said plurality of multicast sessions is idle;

alternating, at a multicast synchronize point, said transmission of said second data over said plurality of multicast sessions so that one of said plurality of multicast sessions other than said first multicast session transmits a second portion of said second data for a period of time during which one of said plurality of multicast sessions other than said second multicast session is idle;

transmitting multicast sequencing data representing said multicast synchronize point; and

responding to a stop request by terminating said transmitting of said first data over said first session.

29. The method as described in Claim 28, further comprising the act of synchronizing said first session and said multicast sessions.

30. The method as described in Claim 28, wherein said plurality of multicast sessions includes only two multicast sessions.

31. The method as described in Claim 28, wherein said first and second data comprise multimedia streams.

32. The method as described in Claim 28, wherein said multicast sequencing data is transmitted before said second data.

33. The method as described in Claim 28, wherein said multicast sequencing data is transmitted over a unicast control channel.

34. The method as described in Claim 28, wherein said multicast sequencing data is transmitted at periodic intervals.

35. The method as described in Claim 28, wherein said period of time is substantially the same for each of said plurality of multicast sessions.

5 36. The method as described in Claim 28, wherein said period of time is different for each of said plurality of multicast sessions.

37. The method as described in Claim 28, wherein said period of time corresponds to the transmission of a number of packets.

10 38. The method as described in Claim 28, wherein said period of time corresponds to units of time.

39. The method as described in Claim 28, wherein at any point in time prior to said terminating, said first session and one of said plurality of multicast sessions transmits substantially the same data.

15 40. The method as described in Claim 28, wherein said period of time is sufficient for a data receiver to join one of said plurality of multicast sessions and for said data receiver to request termination of said data transmission over said first session at said multicast synchronize point.

41. The method as described in Claim 28, wherein said multicast synchronize point substantially corresponds to the end of said period of time.

20 42. The method as described in Claim 28, wherein said terminating is in response to a request to stop transmitting said data over said first session, said request transmitted over a unicast control channel.

43. The method as described in Claim 42, wherein said request to stop transmitting said data over said first session is transmitted over said first session.

25 44. A method of seamlessly switching from a unicast session to a plurality of synchronized multicast sessions, comprising the acts of:

receiving data over said unicast session;

detecting multicast support by an underlying network;

selecting from said plurality of multicast sessions one multicast session to

30 join;

joining said one multicast session;

requesting said unicast session to stop transmitting said data at a next multicast synchronize point; and  
joining remainder of said plurality of multicast sessions.

45. The method as described in Claim 44, further comprising the act of unsubscribing from said unicast session.

46. A system for switching from receiving data over a first session to receiving data over first and second multicast sessions, said system comprising:

a data transmitter transmitting first data over said first session, said data transmitter responsive to a stop request to stop transmitting said first data over said first session at a multicast synchronize point; and

said data transmitter alternately transmitting second data over said first and second multicast sessions, said second multicast session idle when said data transmitter transmits a portion of said second data over said first multicast session, said first multicast session idle when said data transmitter transmits a different portion of said second data over said second multicast session, said data transmitter alternating said transmission of said second data from one of said first and second multicast sessions to the other of said first and second multicast sessions at said multicast synchronize point.

47. The system as described in Claim 46, wherein said data transmitter transmits multicast sequencing data representing said multicast synchronize point.

48. The system as described in Claim 47, wherein said data transmitter transmits said multicast sequencing data over said first session.

49. The system as described in Claim 47, wherein said data transmitter transmits said multicast sequencing data over at least one of said first and second multicast sessions.

50. The system as described in Claim 47, wherein said data transmitter transmits said multicast sequencing data over a fourth session.

51. The system as described in Claim 46, wherein said data transmitter transmits multicast sequencing data representing a duration between at least two multicast synchronize points, said duration sufficient for a receiver to join one of said first and second multicast sessions and sufficient for said data transmitter to respond to a stop

request sent by said receiver to stop transmitting said first data over said first session at a multicast synchronize point.

52. The system as described in Claim 46, wherein said first data and said second data represent substantially the same information.

5 53. The system as described in Claim 52, wherein said first data and said second data represent substantially the same information transmitted at substantially the same time.

54. An apparatus providing a seamless switch from a first session to first and second multicast sessions, comprising:

10 means for transmitting first data over said first session;

means for transmitting second data over first and second multicast sessions;

means for sequencing said second data over said first and second multicast sessions so that said first multicast session transmits first portions of said second data while said second multicast session is idle and so that said second multicast session transmits second portions of said second data while said first multicast session is idle, wherein said first and second multicast sessions transition from a transmitting state to an idle state or from an idle state to a transmitting state at a multicast synchronize point; and

15 means responsive to a stop request to stop transmitting said data over said first session at a multicast synchronize point.

20 55. The apparatus as described in Claim 54, wherein said first multicast session transmits said first portions of said second data for a duration sufficient to allow a receiver to join said second multicast session and sufficient for said receiver to send said stop request to cause said first session to stop transmitting data at said multicast synchronize point.

25 56. A multi-session data stream transmitted from a data source to a data receiver comprising:

a first session including first data;

30 a first multicast session including second data substantially representing first portions of said first data, said first multicast session transitioning to transmit no data at odd multicast synchronize points and transitioning to transmit said second data at even multicast synchronize points;

a second multicast session including third data substantially representing portions of said first data not represented by said second data, said second multicast session transitioning to transmit said third data at odd multicast synchronize points and transitioning to transmit no data at even multicast synchronize points; and

multicast sequencing data representing durations between multicast synchronize points, at least half of said durations sufficient for said receiver to join said first multicast session or said second multicast session and also sufficient for said receiver to send a stop request causing said first session to stop transmitting said first data.

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